

REMARKS

Due to the length of the specification herein, Applicants will cite to the paragraph number of the published patent application (PG Pub) of the present application, i.e., US 2006/0024569, when discussing the application description, rather than to page and line of the specification as filed.

Applicants thank the Examiner for the courtesy extended to Applicants' attorney during the interview held January 7, 2010, in the above-identified application. During the interview, Applicants' attorney explained the presently-claimed invention and why it is patentable over the applied prior art. The discussion is summarized and expanded upon below.

The rejection of Claims 1-12 and 26 under 35 U.S.C. §103(a) as unpatentable over U.S. 6,309,545 (Penth et al) in view of U.S. 6,200,706 (Ashida et al), is respectfully traversed.

As recited in Claim 1, an embodiment of the present invention is a separator especially for lithium high energy batteries, comprising a sheetlike flexible substrate having a multiplicity of openings and having a porous inorganic coating on and in said substrate, the material of said substrate being selected from a nonwoven of electrically nonconductive polymeric fibers, wherein the separator has a weight of less than 50 g/m<sup>2</sup> and a thickness of less than 35 µm and in that the porous inorganic coating is constructed from oxide particles having a primary particle size of from 5 to 100 nm and adhered via SiO<sub>2</sub> or ZrO<sub>2</sub>, wherein the coating is prepared from a sol or suspension comprising a solvent which comprises a mixture of at least one alcohol and at least one hydrocarbon.

During the above-referenced interview, the significance of Figs. 3 to 5, and Table 2 of the specification herein, as argued in the previous amendment, was again discussed. To reiterate, this data demonstrate the influence of solvent on various properties of the resulting

ceramic coating, the only difference being the solvent. Thus, Figs. 3 to 5 exemplify the solvents cyclohexane, isopropanol, and an ethanol-water mixture, respectively. The differences between Figs. 3 and 4, on the one hand, and Fig. 5, on the other hand, are manifest. As described in the specification at paragraph [0051], very apolar solvents such as cyclohexane give the largest porosity and the largest average pore radii, while polar solvents, i.e., such as a mixture of water and ethanol, gives very small pore radii and also lower porosities. The production of ceramic layers using polar solvents and especially of cyclohexane or cyclohexane-containing mixtures is therefore particularly preferable. Moreover, while the broadest claim requires an alcohol and a hydrocarbon, rather than particular hydrocarbons (cyclohexane) and alcohols (isopropanol), the above-discussed showing remains just as valid, since it is relied on to show primarily the significance of using an organic solvent compared to an aqueous solvent as in Penth et al. Clearly, the data in said Figs. 3 to 5 and Table 2 should be sufficient to distinguish over Penth et al.

Based on the discussion at the interview, it appears that the Examiner appreciates the above factors. Indeed, as Applicants' attorney noted during the interview, there is no basis for the Examiner's finding that "the solid materials used in these examples appear to be only ceramics, which is not considered to be conclusive evidence of the reproducibility of these results using the ceramics as coatings on polymeric fibrous substrates. . . ." However, the Examiner queried whether the presence of an acid, as shown in Penth et al and as shown in present Comparative Example 1 would change the pore radius or other properties.

Noting that the disclosure in Penth et al is subject matter of the present assignee, the reason for the use of an acid in Penth et al is as follows.

In Penth et al, an embodiment of the process for making their composite material involves hydrolyzing a metallic compound and precipitating the resultant metal oxide. The initial particle size of precipitated gel is uncontrolled, and thus is peptized with an acid, such

as hydrochloric acid, in order to dissolve the gel. See any of Examples 1.1 to 1.19 therein. Nano-size particles can be obtained in this way. In the process disclosed for the present invention, on the other hand, and as claimed in non-elected Claim 13, no precipitation step is performed and the desired particle sizes are obtained without any necessity of peptizing with an acid. Thus, for example, commercially available sol systems, such as the Levasil 300/30 used in the examples described in the specification herein, may be used. In other words, the acid is used to convert the gel into a sol, but would not be expected to have any effect on pore radius or pore size distribution.

For all the above reasons, it is respectfully requested that the rejection be withdrawn.

The provisional rejection of Claims 1-12 and 26 on the ground of nonstatutory obviousness-type double patenting over Claims 1-12 and 25 of copending application no. 10/524,143 ('143 application), in view of Penth et al, is respectfully traversed. Even if one of ordinary skill in the art were to combine Penth et al with the claims of the '143 application, the presently-claimed invention would not have been obtained, for the same reasons as discussed above with regard to the prior art rejection. In other words, one of ordinary skill in the art would not know that aqueous sols, as disclosed by Penth et al, are insufficient to provide the necessary wetting behavior or complete penetration of nonwoven materials and so to provide defect-free coatings. Accordingly, it is respectfully requested that this rejection be withdrawn.

The provisional rejection of Claims 1-12 and 26 on the ground of nonstatutory obviousness-type double patenting over Claims 1, 3, 4, 7-10, 32-38, 40 and 46-58 of copending application no. 10/501,713 ('713 application), in view of Penth et al and Ashida et al, is respectfully traversed.

Even if one of ordinary skill in the art were to combine Penth et al and Ashida et al with the claims of the '713 application, the presently-claimed invention would not have been

obtained, for the same reasons as discussed above with regard to the prior art rejection, and the double patenting rejection over the '143 application in view of Penth et al and Ashida et al. Accordingly, it is respectfully requested that this rejection be withdrawn.

The provisional rejection of Claims 1-12 and 26 on the ground of nonstatutory obviousness-type double patenting over Claims 1-12 and 31-39 of copending application no. 10/504,144 ('144 application), in view of Penth et al and Ashida et al, is respectfully traversed.

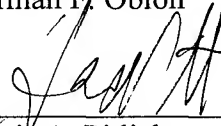
Even if one of ordinary skill in the art were to combine Penth et al and Ashida et al with the claims of the '144 application, the presently-claimed invention would not have been obtained, for the same reasons as discussed above with regard to the prior art rejection, and the double patenting rejection over the '143 application in view of Penth et al and Ashida et al. Accordingly, it is respectfully requested that this rejection be withdrawn.

Applicants respectfully submit that all of the presently-active claims in this application are now in immediate condition for allowance. The Examiner is respectfully requested to rejoin non-elected process claims of even scope, and in the absence of further grounds of rejection, pass this application to issue with all active and rejoined claims.

Respectfully submitted,

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